



**State of Louisiana
Department of Natural Resources
Coastal Restoration Division and
Coastal Engineering Division**

**2004 Operations, Maintenance,
and Monitoring Report**

for

**Cheniere Au Tigre Shoreline
Demonstration**

State Project Number TV-16
Priority Project List 2

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Vermilion Parish

Prepared by:

Troy Barrilleaux, Biological Monitoring Section (CRD)
and
Stan Aucoin, Field Engineering Section (CED)
LDNR/Coastal Restoration and Management
Lafayette Field Office
635 Cajundome Boulevard
Lafayette, LA 70506

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2004 Operations, Maintenance, and Monitoring Report
For
Cheniere Au Tigre Shoreline Demonstration (TV-16)

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I. Introduction

The Cheniere au Tigre shoreline demonstration project is from the 6th priority list of the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA). The project area is located along the shoreline of the Gulf of Mexico, approximately 15 mi (24 km) south of Intracoastal City, Louisiana, in Vermilion parish (figure 1). According to the project environmental assessment, the project area is comprised of approximately 103 acres (41.7 ha), occurring as 38 acres (15.4 ha) of open water, 44 acres (17.8 ha) of brackish marsh, 4 acres (1.6 ha) of coastal beach, 12 acres (4.9 ha) of upland scrub/shrub habitat, and 5 acres of upland forest (2.0 ha). Vegetation occurring adjacent to the shoreline is characterized by *Ambrosia* spp. (giant ragweed), *Acacia smallii* (sweet acacia), *Geranium carolinianum* (wild geranium), *Galium* spp. (bedstraw), and *Opuntia compressa* (prickly pear cactus).

Wetland loss in the project area has occurred as conversion of beach and brackish marsh to open water. Loss of nearly 26 acres (10.5 ha) occurred between 1956 and 1990, as loss of 8 acres (3.2 ha) of coastal beach, 6 acres (2.4 ha) of brackish marsh, and 12 acres (4.9 ha) of scrub/shrub habitat (U.S. Department of Agriculture, Natural Resources Conservation Service 1998). Shoreline retreat in this area between 1956 and 1969 was measured to be 26.6 ft/yr (8.1 m/yr; Louisiana State University Center for Wetland Resources 1978). Another shoreline change study by Byrnes et al. (1995) found the mean shoreline retreat rate for the chenier plain from Cheniere au Tigre to Southwest Pass to be 9.5 ft/yr (2.9 m/yr) during the period from 1883-1994. This loss has resulted primarily from erosional scouring from the same littoral currents which can also contribute to sediment accretion. These littoral currents from the Atchafalaya River and Wax Lake Outlet to the east, cause sediment accretion during periods of slow littoral currents and scouring as current velocity increases from storms and other anthropogenic factors.

The project design involved the construction of 6 rock rip-rap breakwater segments, each 200 ft (61 m) long, with a 120 ft (36 m) gap between segments. Breakwater segments were constructed parallel to the shoreline at a distance of 200 ft (61 m) offshore. Settled elevation of the rock segments was 3.5 ft (1 m) (North American Vertical Datum [NAVD] of 1988). The project design utilized results from a previous breakwater project employed at nearby Holly Beach, Louisiana (Underwood et al. 1999). Specifically, the current project used longer breakwaters with smaller gaps between breakwaters, set at a distance as much as 300 ft closer to the shore than those constructed for the Holly Beach project, in order to further reduce wave energies and allow sufficient sediment availability for the westernmost areas of the project. The actual number of breakwater segments constructed was dependent on the costs of the rock rip-rap and construction, and resulted in a total of 6 breakwater segments. Construction was initiated in July 2001 and completed in September 2001.





Figure 1. Location of the Cheniere au Tigre (TV-16) shoreline protection project and the locations of the constructed rock breakwaters.

II. Maintenance and Operation Activity

This is a demonstration project, Therefore no maintenance, inspections, or operations plans are applicable. A close out report developed from a future survey will be developed in the final years of the project life.



III. Monitoring Activity

a. Monitoring Goals

The objective of the Cheniere Au Tigre Shoreline Demonstration project is to protect the beaches and interior brackish marshes through the use of segmented breakwaters.

The following goal will contribute to the evaluation of the above objectives:

1. Protect the acreage of the interior brackish marshes by reducing the rate of beach erosion.

b. Monitoring Elements

Aerial Photography:

Near-vertical color-infrared aerial photography (1: 6,000 scale) was used to measure vegetated and non-vegetated areas for the project, updrift, and downdrift areas and to document long term shoreline changes. The photography was obtained in 2000 prior to project construction and will be acquired in 2005 following construction. Additional photography may be obtained in response to storm events. The original photography was checked for flight accuracy, color correctness, and clarity and was subsequently archived. Aerial photography was scanned, mosaicked, and georectified by USGS/NWRC personnel according to standard operating procedures (Steyer et al. 1995, revised 2000).

c. Preliminary Monitoring Results and Discussion

Aerial Photography:

Pre-construction aerial photography was acquired in 2000 (figure 2), approximately 10 months prior to construction. The next photography is scheduled for 2005.

Shoreline Position:

As-built shoreline position was documented in 2002 (figure 3) and although no subsequent shoreline information has been collected, qualitative observations indicate that the shoreline is prograding and sediment is accumulating both along the shoreline and immediately shoreward of the breakwater segments (figures 4 and 5). Similar responses have been observed at the Holly Beach Breakwaters (CS-01) and Raccoon Island (TE-29) projects.



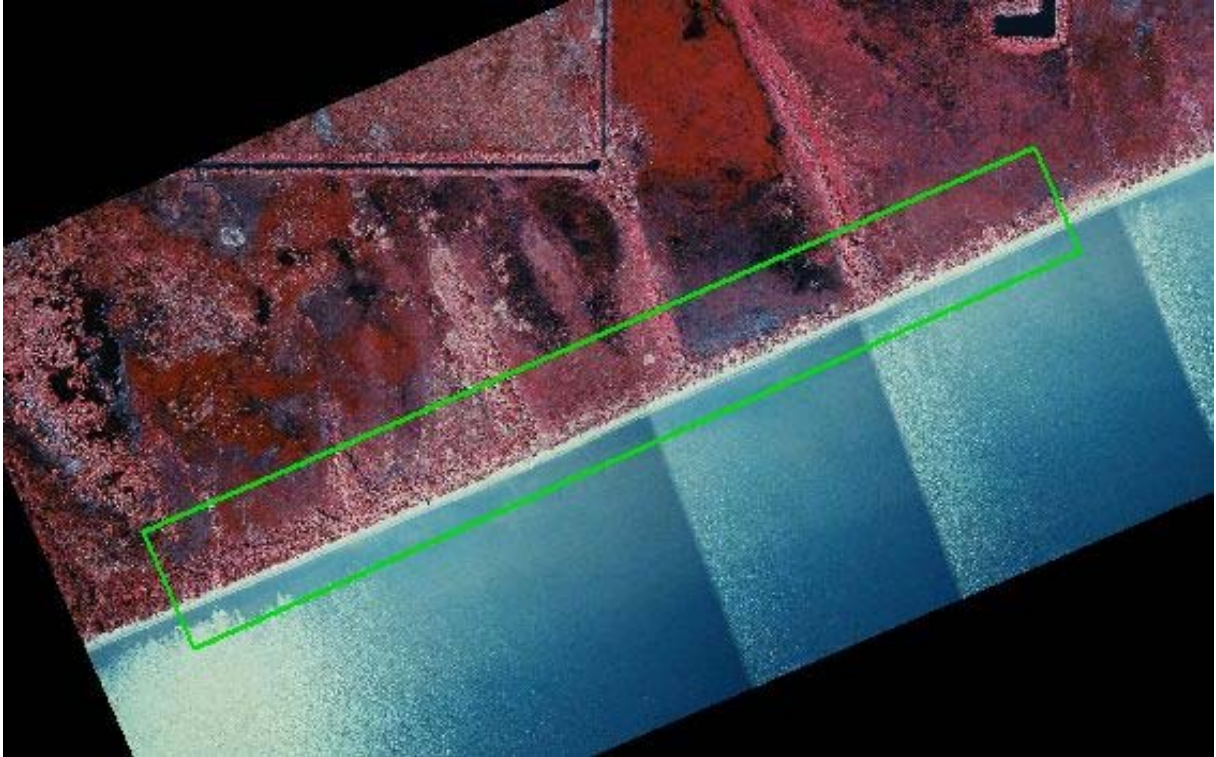


Figure 2. 2000 photo mosaic with overlaid project boundary acquired approximately 10 months prior to construction.

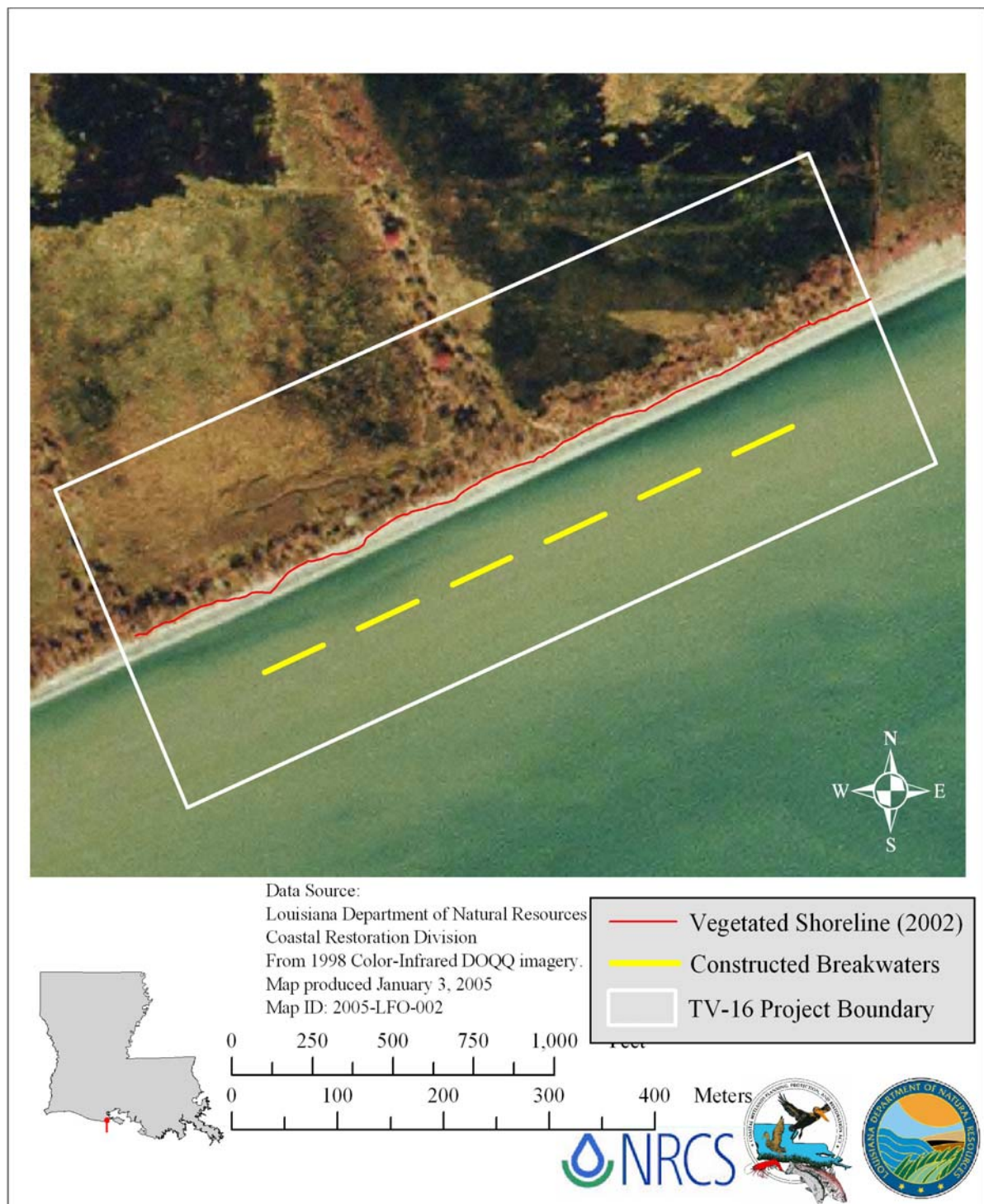


Figure 3. Shoreline position (seaward edge of shoreline vegetation) documented in April 2002 using differentially corrected Global Position System data.



Figure 4. Segmented rock breakwater showing foreshore accreted sand approximately 6 mo. following construction.



Figure 5. Shoreline of Cheniere au Tigre.

IV. Conclusions

a. Project Effectiveness

The project appears to be functioning as designed. No structural damage was sustained from Hurricane Lili in October 2002. Qualitative observations indicate that the shoreline is prograding and sediment is accumulating both along the shoreline and immediately shoreward of the breakwater segments. The areas adjacent to the rock dike are still experiencing losses due to erosion.

b. Recommended Improvements

An engineering close-out report will be developed outlining the successes/ failures of the project. The report will incorporate information garnered from a structural assessment survey performed by a licensed engineering/ land surveying firm.

c. Lessons Learned

Initially, this project was a demonstration project intended to use new innovative designs for shoreline protection. Feasible, cost effective designs could not be developed by construction contractors, therefore rock was eventually incorporated into the design. This project has been so successful that DNR/CED has funded a continuation of the existing project.

V. Literature Cited

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